
Bruce E. Goldstein

Solar Wind Ion Distribution Functions

Velocity-space distributions of protons and alpha-particles in the high-speed solar wind are calculated from Ulysses SWOOPS data. Although a wide variety of one- and two-stream distributions are observed, there are systematic differences in the distributions which depend on the drift speed between the protons and alphas. A variety of distributions for the alpha particles are seen. At times the alpha particles resemble a single beam, at times the alpha distribution is quite symmetric in the dimension parallel to the magnetic field and appears squashed in the perpendicular dimension. The alpha-particle isocontours in these cases look like cylinders with spherical end pieces. And at other times the alpha particle distributions exhibit two beams, with the faster beam being the denser. For protons, the slower of the two beams is more typically of higher density than the faster beam. Possible microphysical processes that might be responsible for these distributions are discussed.

To be presented at the Ulysses/Voyager/ACE Heliospheric Workshop, Oxnard, CA, October 15-19, 2001. This Workshop is sponsored by the Ulysses Project (JPL).